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Concept Attainment Strategy Alteration as a Function of Dogmatism

James M. Torcivia
Loyola University Chicago

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**Concept Attainment Strategy Alteration
As a Function of Dogmatism**

by

James M. Torcivia

**A Thesis Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment of
the Requirements for the Degree of**

Master of Arts

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Life

James M. Torcivia was born in Milwaukee, Wisconsin, July 25, 1942.

He graduated from Marquette University High School, Milwaukee, in May, 1960. He received the degree of Bachelor of Arts in the Social Sciences from Regis College, Denver, Colorado, in June, 1964.

The author began his graduate studies at Loyola University in September, 1964.

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Concept Attainment Strategy Alteration

As a Function of Dogmatism

James M. Torcivia

Loyola University

In 1960, Milton Rokeach published his work on the distinguishing characteristics and attributes of open and closed minded individuals. Of chief interest to this paper is his argument that dogmatism, the closed end of the open-closed continuum, is but a more inclusive or expansive form of authoritarianism as discussed in the Fromm (1941), Maslow (1943), and Adorno et al. (1956) tradition, where authoritarianism manifests itself in outgroup vilification and ingroup glorification. More specifically, authoritarianism, as discussed by the Berkeley Group, is defined in terms of potential for right-wing political or ethnic sentiments rather than in terms of a general personality characteristic or syndrome which shapes the belief system or structures the way in which individuals will orient their beliefs in general. The emphasis, then, in dogmatism, is on the way in which a person orients his beliefs rather than on any specific content of the total belief system.

A belief-disbelief system is defined by Rokeach as ". . . all the beliefs, sets, expectancies, or hypotheses, conscious and unconscious, that a person at a given time accepts as true of the world he lives in . . .", (p. 33).

He further states that this system "serves two powerful and conflicting sets of motives at the same time: the need for a cognitive framework to know and to understand, and the need to ward off threatening aspects of reality," (p. 67). He explains that the belief system will be open to the extent that the need to know dominates, and will be closed to the extent that the need to ward off threat is the dominant need. He insists, however, that for most people these two needs operate concomitantly; that is, a person will be open to information insofar as possible, and will reject it insofar as necessary.

The need to ward off threat generally operates in at least two manifest ways in a problem-solving situation. First Rokeach presents discussion and experimental evidence suggesting that there are two logically and experimentally separable factors in the problem-solving situation, namely, analysis and synthesis. In the analysis process the individual's activity is directed toward the overcoming of old beliefs or mental sets and replacing these with new ones which will be appropriate in reaching a solution to the problem. The synthesis phase, on the other hand, demands that the individual organize these new beliefs by some process of integration into a new operating belief subsystem. The end result of this reorganization will be the solution to the problem. Diagrammatically, the process can be pictured as in Fig. 1.

measurements being taken on analysis and synthesis performance. He found that the two groups did not differ on their ability to analyze, but the synthesis process was far less efficient for the dogmatic group in terms of time taken to synthesize material. Rokeach favors the interpretation that the differences arose from the greater situational threat to the dogmatic than to the open minded individual.

Testing the possibility that these differences could have been an artifact of the novelty of the problem to be solved, Rokeach altered the problem so that it appeared to be similar to those encountered many times in the subject's experience. Again significant differences were obtained, further indicating that dogmatism does, perhaps, share some basic relationship to the cognitive structure of the individual rather than to the content of the material itself.

This need to ward off threat, characteristic of the closed minded individual, manifests itself first, then, in a decreased ability to effectively synthesize new material into an already existing cognitive structure.

Another way in which the need to ward off threat manifests itself is in the information orientation of the individual. Rokeach and others make a distinction between at least two types of social influences, the first being those influences which stem from the source or author of the situation, and the second, influences stemming from the intrinsic

characteristics of the situation itself. Numerous studies both before and after Rokeach have satisfactorily demonstrated this distinction; (Deutsch & Gerard, 1955; Kelman & Eagly, 1965; Mills & Aronson, 1965; McDavid, 1959). One of the most important distinctions which Rokeach makes between open and closed minded individuals is that whereas the former are capable of acting on the situation according to the inner requirements of that situation, dogmatic individuals find it difficult to separate the requirements of the situation from the expectations or perceived demands of the source or author of the situation, and more especially when the situation is somehow threatening. As Rokeach explains it, feeling threatened attunes the dogmatic person to irrelevant internal and external pressures --- pressures, then, arising from the situation or author. He confuses or reconciles these two on the basis of the ability of the author to mete out reward and punishment (not necessarily physical), rather than on the cognitive correctness of the author or authority. Putting this in a slightly different way, the open minded person allows a given situation to structure his approach to handling that situation, while the dogmatic person attempts to impose an external, and often irrelevant, structure on the situation. The dogmatic person, then, attempts to structure a given situation in accordance with his need to ward off a perceived threat.

Experimental evidence for this position may be drawn from Powell (1962) who compared open and closed minded individuals on their ability to differentiate source and message and found that closed minded individuals were indeed less able to do this effectively, acting more upon less-relevant source characteristics than on core-situational characteristics. It can then be logically reasoned that such "source-interference," if misleading, will lead to poorer performance in adjusting to, or effectively handling, the situation as the inner (relevant) requirements of the core-situation would demand.

As the development now stands, dogmatism, which develops as a defense against threat to one's belief system, leads to two outstanding phenomena. First, in a problem solving situation in which both analysis and synthesis are required to reach a solution the dogmatic person should be less efficient than the open minded individual owing to his difficulty in efficiently carrying out the synthesis phase of the problem solving process (Rokeach, 1960). Secondly, as a result of his increased sensitivity or attentiveness to social threat the dogmatic person will be less able to separate source expectancies from the inner requirements of the situation (Powell, 1962). If source expectations are incorporated into the problem-solving situation, then, and if these expectations are somehow misleading, the individual will act less effi-

ciently upon the relevant intrinsic requirements (which are devoid of this source interference) of the situation, and will consequently be a less efficient problem solver.

Throughout the preceding discussion most of the supportive research cited has been drawn from Rokeach's own work. Because the primary issue was not problem solving, but rather dogmatism, the problem solving task served essentially as a tool, used in the investigation of the operation of dogmatism. What happens, then, when one measurement is substituted for another? Rokeach would argue, of course, that such a case would make little difference, because of his insistence on the fact that open and closed mindedness refers to the way in which a person believes --- believes anything. The distinction would hold regardless of the nature of the task as long as that task involved the substitution or admission of a new belief subsystem to the present belief system.

This being the case, one can remove the concept of dogmatism from the area of "pure" problem solving and bring it to bear on the study of concept attainment and expect similar findings to those already presented. The present paper involves such a transposition.

Unlike most forms of experimental problem solving in which the subject is given a set of data and asked to reorganize this data into some new way or to use this data as the basis for inductive or deductive reasoning, the concept attainer

is given a surplus of information and asked to sort out the relevant from the irrelevant information in such a way that he will ultimately identify all that is relevant to the concept or idea and to reject or eliminate all that is irrelevant. Furthermore, whereas in problem solving the cognitive processes are usually inaccessible to the observer, or at best, inferentially accessible only, in concept attainment the experimenter is often in a position to measure rather accurately just what process the subject is using in his efforts to attain the concept. The process is, in a sense, "slowed down" so that the experimenter can subject it to more detailed and accurate analysis. Following from this, then, one can say that in studying dogmatism, using the tool of concept attainment, the researcher is able to rather accurately compare individuals classified on the open-closed continuum on the strategies used to attain a concept. This is not to say that this paper is interested in investigating differences in strategies. What is important, however, is that in having an objective method by which to analyze strategies the researcher is provided with an objective method by which to investigate how readily a subject is willing to substitute one strategy for another when the inner requirements of the situation dictate such a change. Strategy is defined as "that pattern of decisions in the acquisition, retention, and utilization of [new] information that serves to meet certain

objectives," (Bruner et al. 1956, p. 54). It is actually the summed processes of analysis and synthesis, and therefore, in changing strategies the subject is in effect adopting a new and to some extent contradictory belief subsystem (as to how to proceed in solving the problem). This would suggest that the dogmatic person will have a more difficult time in changing or altering his strategy than will the open minded person. This, then, is carrying the work of Rokeach one step further. For here, rather than investigating the amount of synthesis of which an individual is capable in any given situation, this study explores the readiness of an individual to adopt and utilize a new belief subsystem which is, in fact, the ultimate criterion of open versus closed mindedness. This is not to deny, of course, that the ability to synthesize serves as a fundamental causal distinction; but rather, this is a shift in emphasis from the analysis of dogmatism per se to the study of the function of dogmatism within meaningful cognitive operations of the individual.

Strategy measures.--At this point it might be wise to take a closer look at the nature of focusing and scanning strategies (the two basic strategies considered in this paper) and of the relationship between them. Laughlin (1965) defines focusing as the strategy in which "[the] S tests the relevance of all the possible hypotheses involved in a particular attribute or attributes by choosing a card differing in one (conservative

focusing) or more (focus gambling) attributes from a positive focus card." He defines scanning as that strategy in which the subject "tests specific hypotheses, either singly (successive scanning) or all at once (simultaneous scanning) or some intermediate number." Note that in scanning, therefore, the focal point is not one of attributes, but rather, one of hypotheses.

Although it might appear that these two strategies are mutually exclusive, or that they are the only strategies possible in the concept attainment task, it should be clearly stated that it is only for purposes of theoretical development that they will be treated as such. That they are theoretically distinguishable strategies cannot be denied. And that they are to a certain extent empirically unrelated is also acknowledged. However, the $+0.54$ correlation reported by Laughlin (1966) gives ample evidence that the two share a great deal of basic similarity, if only as a consequence of the scoring methods used. And the justification for using these moderately correlated measures as though they were more exclusive lies in the fact that at the time of this study these are the most empirically productive measures available for assessing concept attainment strategy. Although they are not entirely satisfactory, then, they do meet the needs of this paper insofar as they do, to some degree, reflect differing approaches to the attainment of concepts.

Secondary measures: Strategy inefficiency.--If one can make the assumption that the concept attainment task leaves great room for subject responses other than perfect focusing or scanning (and certainly all empirical evidence and experimental observation support this assumption) then the question must be raised as to what these other responses are that are coming into play. In large part the concept attainment task, for the subject, involves trial and error learning, a certain amount of bewilderment, and a great deal of uncertainty as to just how to go about solving each problem most efficiently. For, in the majority of cases an approximation of either focusing or scanning strategy is arrived at by the subject after a period of initial "stabbing in the dark." And even after a strategy starts to become crystallized for the subject it is still difficult for him to use this strategy without a certain amount of redundancy and backtracking. For this reason "measures of strategy inefficiency" have been developed to assess these responses: (a) number of card choices to solution; (b) number of untenable hypotheses; (c) number of repeated card choices; and (d) number of repeated hypotheses made by each subject. It is assumed that each of these measures reflects a decrement in strategy efficiency by S in solving the concept attainment problems. Thus, the greater the number of incidences of any of these responses, the greater the degree of inefficiency in the concept attainment process being used.

In addition to the distinction between focusing and scanning, and the four measures of inefficiency, three other characteristics of the concept attainment task should be explained.

Learning effects.--Anyone familiar with concept attainment tasks will readily recognize the difficulty involved in conveying to the subject just exactly what he is supposed to do during the testing session. Instructions, no matter how clearly stated or laced with examples, are always difficult for the subject to understand, and even more difficult to efficiently and smoothly carry out on the initial attempts. Individual differences, in addition to dogmatism, are given far more opportunity to operate, then, on the initial problem or two. However, to designate Problems a, b, c, ... as "training problems" and Problems m, n, o, ... as "testing problems" can not be justified, as such procedure would imply learning to "X" criterion for each subject by the time he was presented with the testing problems. The nature of the learning variable is too little understood with regard to concept attainment tasks to make this distinction between training and testing.

Low task ceilings.--In addition to a learning variable, it should be noted that the level of difficulty in concept attainment tasks is a positive function of the number of attributes and the number of values corresponding to each attribute that are involved in the task. With two values per attribute

this function is highly accelerated after a base of five attributes. Up until this time the problems are relatively easy to solve by either scanning or focusing. It is not until the subject is presented with six-attribute, two-value problems that scanning really becomes an inefficient concept attainment strategy and focusing becomes the most efficient strategy. The difficulty with scanning is that it imposes a relatively large memory burden on the subject (Bruner et al. 1956; Cahill & Hovland, 1960; Hunt, 1961). Compensating for this memory burden is the advantage of scanning over focusing that a greater amount of information can often be gained from a successful instance of scanning than a successful instance of focusing. With four or five attribute problems this compensatory mechanism is generally operative. With six-attribute, two-value (64 instance) concept attainment arrays it rarely is, and thus it is here that scanning becomes much less efficient than focusing.

Practice effects.--Although the theoretical discussion of the nature of dogmatism takes the position that closed minded individuals will have more difficulty in making strategy change when such change is required, there is nothing to suggest that they will not eventually be able to make this change and hence, perform just as satisfactorily as open minded persons after the change has been made. Thus, it is the process of change, rather than of performance per se, which theoretically distin-

guishes dogmatic from nondogmatic individuals. One would expect, then, that given a sufficient amount of problems, neither group would perform differently than the other after strategy change had been accomplished. The difficulty, then, becomes one of designating precisely when practice effects will compensate for effects due to differences in ability to alter strategies; and as with the learning confound, the nature of this variable is too little understood with regard to concept attainment tasks to make the empirical distinction. One would be able to predict only that at some point in the series of problems the differences between High and Low Dogmatic individuals due to differing abilities to alter strategies would begin to disappear.

Aside from studying dogmatism from the standpoint of the ability to carry out the synthesis phase of a problem solving task, it may also be investigated in terms of the differential effects of social threat on dogmatic and non-dogmatic individuals within a concept attainment situation. It was suggested earlier that when placed in a person-to-person threat situation the dogmatic person will find it more difficult to separate the information received through source cues from the information received through core-situational cues. He will subsequently act more in accordance with the expectations of the source than with the demands of the situation. If, then, the dogmatic subject feels that the source (i.e., experi-

menter) expects one type of concept attainment strategy he would be expected to persist in utilizing that strategy even though the situation in which he is involved indicated that he should switch to another strategy.

Although this factor of social threat would appear across all conditions whenever the procedure involved the interaction between an experimenter and a subject, it is still possible to manipulate the degree of social threat to which subjects are exposed, and in thus doing, explore the extent to which greater and lesser degrees of social threat will differentially affect dogmatic and non-dogmatic individuals. It will be remembered that dogmatism will operate to the extent that there is a need to ward off threat. If, then, some factor is introduced to the concept attainment task which one might expect would increase the amount of social threat operative, it might also be expected that this factor would allow of an even greater decrease in concept attainment efficiency for the dogmatic person, while for the relatively open minded individual such an additional factor would not be expected to contribute to a decrease in performance. (No attempt will be made in this paper to partial out the unique effects of each of these two variables --- source interference and the experimentally manipulated social factor ---; rather, both will be concomitantly operative, and any differentiating effects in dogmatic versus non-dogmatic subjects must be attributed to the combined

effects of both of these as a general index of social threat).

In summary, then, the preceding discussion has been intended to bring to light five basic considerations: (1) an individual will be open minded to the extent that the need to know dominates, and will be closed to the extent that the need to ward off threat is the dominant need. (2) The degree of closed mindedness in a problem-solving situation will manifest itself in two ways; a. an inability to synthesize novel material which is in competition with the present belief system, and b. a heightened sensitivity to the wishes of the source (i.e. experimenter) of the problem and a decreased focus on the core-situational demands of the problem itself. (3) Dogmatism is operative as a defense against a real or subjectively experienced threat to the belief system and in proportion to the degree of threat experienced or perceived. (4) The emphasis in dogmatism is on the ability to synthesize (i.e., alter strategies); not on the ability to perform, per se; and (5) Focusing and Scanning are distinguishable measures of concept attainment strategy and involve the processes of analysis and synthesis.

Stated in general, the hypotheses for this study are:

Dogmatism.--1. High Dogmatic subjects will have more difficulty in changing from a previously appropriate strategy to a currently more appropriate focusing strategy than will non-dogmatic subjects and this difference will appear most signi-

ficiently in the fourth problem. 2. On all measures of inefficiency, highly dogmatic subjects will obtain higher scores than will non-dogmatic subjects. These group differences will increase with problem difficulty and will be most significant within the fourth problem.

Social threat.--1. Performance differences between High and Low Dogmatic subjects will increase with increases in social threat (hereafter referred to as "social significance"). 2. These differences will reflect increasingly poor performance within the dogmatic group rather than increasingly better performance within the non-dogmatic group. Thus:

Strategy measures.--On focusing and scanning (a) A dogmatism by Problem interaction is predicted where the Low Dogmatic group will increase more rapidly than the High Dogmatic group. (b) A Dogmatism by Social Significance interaction is predicted where the High Dogmatic group will decrease with increases on social significance while there will be no effect upon the Low Dogmatic group. (c) T-tests within Problem 3 will show no differences between Dogmatism Groups. (d) T-tests will show significant differences between High and Low Dogmatic groups on Problem 4, with Low Dogmatic subjects scoring higher than High Dogmatic subjects. (e) There will be no differences between these two groups on Problem 5.

Secondary measures.--On Number of Card Choices to Solution, Number of Untenable Hypotheses, Number of Repeated Card Choices

and Number of Repeated Hypotheses made by subjects: (a) A main Dogmatism effect is predicted with High Dogmatic subjects scoring higher than Low Dogmatic subjects. (b) A main Social Significance effect is predicted indicating High Dogmatic subjects scoring higher than Low Dogmatic subjects. (c) T-tests within Problem 3 will show no differences between Dogmatism Groups. (d) T-tests will show significant differences between High and Low Dogmatic groups on Problem 4, with High Dogmatic subjects scoring higher than Low Dogmatic subjects. (e) There will be no differences between these two groups on Problem 5.

Method

Design.--The design was a 2 X 2 X 5 repeated measures factorial with the variables (1) Dogmatism (High and Low), (2) Social Significance (High and Low), and (3) Problems (five for each subject).

Subjects.--Forty-two Female students attending a summer school session between their Sophomore and Junior, or Junior and Senior year of high school were selected for this study. Ss were randomly assigned to either a High Social (HS) or a Low Social (LS) Significance condition with the sole restriction that there would be an initially equal N of twenty-one Ss in each condition.

Materials.--Two stimulus arrays (High Social and Low Social Significance) were prepared for this study. The stimulus array for HS consisted of a 40 X 60 inch black posterboard upon which

were displayed 64 3 X 5 white unlined index cards arranged in 8 rows of 8 cards each. All cards were numbered in the upper right hand corner by rows. Each card consisted of an achromatic sketch within which six attributes at one of two values each could be designated. These attributes and corresponding values were Time (day or night), Sex (male or female), Weapon (fist or club), Position (standing or running), Race (Negro or White), and Location (indoors or outdoors). Each card (instance) depicted a "socially threatening" theme which suggested that a small child was physically threatening his parent. These attributes and values were listed on a reference card to which Ss would be able to refer throughout the experimental sessions.

A 30 X 40 inch white posterboard was used in the LS Condition. This board displayed 64 2½ X 4 inch cards arranged and numbered in a manner similar to that already described. The attributes and corresponding values comprising the instances of this board were six basic color attributes (blue, orange, black, yellow, green, and red), always presented in this same order with respect to one another, and either a plus sign (+) or a minus sign (-) for each of these six colors. A reference card listing these attributes and values was also prepared for the subjects.

The cards on the stimulus arrays were ordered so that each attribute value varied systematically from one card to

the next. In summary, then, each card (instance) represented one possible combination that could be made by using only one value for each of the six different attributes. All six attributes were represented on each instance. Each stimulus array represented all of the possible combinations of these attributes and values.

In addition to the stimulus arrays, two other posterboards ("coverboards") were prepared for each array. They were of the same dimensions and color as the arrays ; however, one had the upper left quarter, and the other the entire left half cut away, so that when placed over the original stimulus arrays only 16 or 32 of the instances would be exposed to Ss.

Procedure.--All Ss received five two-attribute, two-value concept attainment problems, one after another. The first two were of equal difficulty, the third of an increased difficulty, and the fourth and fifth of a further increased (but equal to each other) difficulty. Problem difficulty was manipulated by use of the two coverboards previously described. By using the quarter-cut coverboard for the first two problems only sixteen instances were exposed. These sixteen cards allowed for value fluctuation in only four (rather than six) attributes. Thus, these problems could be considered as involving four rather than six relevant attributes. The half-out coverboard, used on the third problem, allowed for value fluctuation in five of the attributes. No coverboard was used for

Problems 4 and 5, thus allowing for value fluctuation in all six attributes. The increase in number of relevant attributes from four to six has the effect of increasing the number of non-redundant irrelevant attributes from two through four (in two-attribute, two-value concept attainment problems), thus increasing problem difficulty, (Bruner et al., 1956), and requiring increased use of a more efficient strategy (i.e., focusing) for successful problem solving, (Bruner et al. 1956; Battig and Bourne, 1961; Bourne and Haygood, 1959; Hunt, 1960; Laughlin, 1966).

Problems were randomly assigned with the exception of the first, which was held constant for all Ss (within Social Significance conditions).

Using the appropriate stimulus array with all 64 instances exposed for the example, the problem solving procedure was explained to each S. Ss were informed that the problems could be solved by choosing any card they wished and by guessing at the correct concept (problem solution). The phrase "choose any card you wish" and the word "guess" were used as an attempt to discourage Ss from employing a focusing strategy on their initial solution attempts; (see Appendix I for complete transcripts of the instructions for each condition). Ss were then given their first problem.

After the last problem had been solved each S was administered the Rokeach Dogmatism (E) Scale (Rokeach, 1960) and the

Gough-Sanford Rigidity Scale (In Rokeach, 1960). She was then asked not to discuss the procedure or questionnaires with her classmates, and dismissed.

Results

On the basis of their scores on the Rokeach E Scale Ss in each of the two conditions, HS and LS, were divided into three groups (High, Moderate and Low Dogmatism -- HD, MD, and LD) of 7 Ss each. Mean Dogmatism scores for these six groups are presented in Table 1.

Table 1

Mean Scores on the Rokeach Dogmatism Scale For
High and Low Social Significance Conditions

	Dogmatism		
	High	Moderate	Low
High Social	133.43	98.29	62.71
Low Social	132.14	95.14	70.71

Note.--n = 7 in each cell

The MD Group (n = 14) was then dropped from further analysis and only the extreme groups were used for the purposes of this study.

Focusing.--Focusing strategy was scored according to three rules: (Rule 1): Each card choice had to obtain information on one new attribute. New information was obtained if the card choice altered only one attribute not previously proven irrelevant (conservative focusing), or, if more than one attribute

was altered (focus gambling), the instance was either positive or the ambiguous information was correctly resolved on the next card by altering only one of the attributes. (Rule 2): If a hypothesis was made it had to be tenable considering the information available. Untenable hypotheses were of two types: (a) a hypothesis for a value of an attribute when the other value had previously occurred on a positive instance, e.g., the hypothesis "red-plus" when an instance including red-minus had been positive; (b) a hypothesis for a value which had previously occurred on a negative instance, e.g., the hypothesis "red-plus" when an instance including red-plus had been negative. (Rule 3): Neither the card choice nor the hypothesis could be a repetition of a previous card choice or hypothesis. Each card choice and accompanying hypothesis that satisfied these three rules was counted as an instance of focusing. The total number of such instances was then divided by the total number of card choices made by S. This resulting score was then further divided by the number of attributes that the problem involved (i.e., 4, 5, or 6) to give a final focusing score interpretable as a ratio of the amount of focusing strategy employed per card choice to the total amount of focusing strategy possible for a given problem.

The hypotheses predict a Dogmatism by Problem, and a Dogmatism by Social Significance interaction. Table 2 presents the mean focusing ratios for the 20 cells of this study, and

Table 3 reports a summary of the ANOVA.

Table 2

Mean Focusing Ratios for High and Low Dogmatic
Subjects on Social and Non-social Boards
For Each Problem

		Problems				
		1	2	3	4	5
High Dog.	Social	.15	.10	.09	.05	.09
	N-soc.	.15	.15	.11	.03	.08
Low Dog.	Social	.14	.12	.11	.08	.09
	N-soc.	.05	.11	.09	.05	.07

Table 3

ANOVA on Focusing Ratios

	<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A	Dogmatism	1	.0028	<1
B	Soc. Sig.	1	.0067	<1
AB		1	.0123	1.66
Error (B)		24	.0074	
C	Problems	4	.0243	3.43*
AC		4	.0056	<1
BC		4	.0046	<1
ABC		4	.0022	<1
Error (W)		96	.0071	

* $p < .01$

It is evident from this table that the only significant finding obtained was that related to Problems. The other two main effects and the four interactions are all insignificant. In addition to the ANOVA predictions the hypotheses also state that t-tests within Problems 3 and 5 will be insignificant while within Problem 4 Low Dogmatic ss will score significantly higher than High Dogmatic subjects. The t-test on Problem 3 was insignificant ($t = .43$, $df = 26$, NS, 2-tail). On Problem 4 significant differences were obtained between HD and LD, ($t = 7.53$, $df = 26$, $p < .01$, 1-tail) with LD greater than HD. HD was significantly greater than LD on Problem 5 ($t = 7.83$, $df = 26$, $p < .01$, 2-tail).

Scanning.--Scanning strategy was scored by comparing each card in turn with the given problem card. If the selected card was positive, all concepts differing on the given and selected cards were eliminated; if the selected card was negative, all concepts identical on the given and selected cards were eliminated. The total of the number of concepts thus eliminated plus those concepts eliminated by direct hypotheses was then divided by the total number of card choices made by the subject in order to give the average number of concepts eliminated per card choice. A correction model similar to that used in focusing was then applied to these scores by dividing each score by the number of possible hypotheses involved in the problem, (i.e., 6, 10, or 15) to yield a ratio of total number of hypotheses eliminated per card choice to

total number of hypotheses that could possibly be eliminated.

The hypotheses predict a Dogmatism by Problem, and a Dogmatism by Social Significance interaction. Table 4 presents the mean scanning ratios for the 20 cells of this study, and Table 5 reports a summary of the ANOVA.

Table 4
Mean Scanning Ratios for High and Low Dogmatic
Subjects on Social and Non-social Boards
For Each Problem

		Problems				
		1	2	3	4	5
High Dg.	Social	.97	.85	.37	.13	.21
	N-Soc.	1.02	1.02	.59	.20	.24
Low Dg.	Social	1.10	1.00	.46	.20	.20
	N-Soc.	.53	.97	.45	.18	.21

Table 5

ANOVA on Scanning Ratios

	<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A	Dogmatism	1	.0334	<1
B	Soc. Sig.	1	.0034	<1
AB		1	.4623	2.06
Error (B)		24	.2239	
C	Problems	4	3.8451	18.44*
AC		4	.0520	<1
BC		4	.1463	<1
ABC		4	.0940	<1
Error (W)		96	.2061	

* $p < .001$

Again, as on the focusing measure, the only significance obtained was that related to problems. The two other main effects and the four interactions were all insignificant.

The hypotheses also predict that t-tests within Problems 3 and 5 will not reach significance, while within Problem 4 the Low Dogmatic group will score significantly higher than the High Dogmatic group. For Problem 3 the results of the t-test were insignificant ($t = 1.16$, $df = 26$, NS, 2-tail). Within Problem 4 LD scored significantly higher than did HD ($t = 2.64$, $df = 26$, $p < .01$, 1-tail). Within Problem 5 HD was significantly higher than LD ($t = 3.18$, $df = 26$, $p < .01$, 2-tail).

Card Choices.--The hypotheses state that there will be a

significant main effect between HD and LD, and that no significance will be found within Problems 3 and 5. On Problem 4 High Dogmatic gs will score significantly higher than Low Dogmatic subjects. The correction model here involves dividing each gs score by the number of different card choices possible (i.e., 16, 32, or 64) in the problems. Table 6 presents the means for the 20 cells of this study and Table 7 reports a summary of the ANOVA performed on this data.

Table 6
Mean Card Choice Ratios for High and Low Dogmatic
Subjects on Social and Non-social Boards
For Each Problem

		Problems				
		1	2	3	4	5
High Dog.	Social	.19	.46	.19	.12	.03
	N-soc.	.19	.15	.11	.10	.06
Low Dog.	Social	.17	.12	.21	.12	.06
	N-soc.	.16	.20	.12	.08	.10

Table 7

ANOVA on Card Choice Ratios

	<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A	Dogmatism	1	.0327	< 1
B	Sec. Sig.	1	.0718	1.92
AB		1	.0584	1.56
Error (B)		24	.0374	
C	Problems	4	.1023	5.56*
AC		4	.0317	1.72
BC		4	.0190	1.03
ABC		4	.0508	2.76
Error (W)		96	.0184	

* $p < .001$

Thus, the only significant main effect was that dealing with Problems. None of the interactions were significant.

The t-tests on Problems 3 and 4 were significant. On Problem 3 Low Dogmatic Ss scored higher than High Dogmatic Ss ($t = 9.70$, $df = 26$, $p < .01$, 2-tail). The results on Problem 4 were reversed with HD scoring higher than LD ($t = 1.09$, $df = 26$, $p < .05$, 1-tail). Results on Problem 5 were nonsignificant, ($t = 1.62$, $df = 26$, NS, 2-tail).

Untenable Hypotheses.--The hypotheses state that there will be a significant main effect between High Dogmatic and Low Dogmatic subjects and that no significance will be found within

Problems 3 and 5. Within Problem 4 significant differences will be obtained with HD scoring higher than LD. The correction model for this measure involves dividing each S's score on each problem by the number of different hypotheses possible on that problem, (i.e., 6, 10, or 15).

Table 8 presents the means for the 20 cells of this study and Table 9 reports a summary of the ANOVA.

Table 8
Mean Untenable Hypotheses Ratios for
High and Low Dogmatic Subjects
On Social and Non-social Boards
For Each Problem

		Problems				
		1	2	3	4	5
High Dog.	Social	.0018	.0322	.0145	.0030	.0050
	N-soc.	.0140	.0119	.0085	.0077	.0052
Low Dog.	Social	.0153	.0089	.0099	.0067	.0038
	N-soc.	.0074	.0113	.0061	.0062	.0046

Table 9

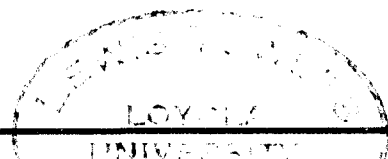
ANOVA on Untenable Hypotheses Ratios

	<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A	Dogmatism	1	.00055493	2.93
B	Soc. Sig.	1	.00041105	2.17
AB		1	.00009329	<1
Error (B)		24	.00018965	
C	Problems	4	.00066764	<1
AC		4	.00017399	<1
BC		4	.00014869	<1
ABC		4	.00022253	<1
Error (W)		96	.00076829	

These results indicate that none of the main effects were significant; and furthermore, none of the interactions were significant.

T-tests within Problems 3 and 4 were significant. In Problem 3 High Dogmatic subjects made significantly more untenable hypotheses than did Low Dogmatic subjects ($t = 3.68$, $df = 26$, $p < .01$, 2-tail). LD made more untenable hypotheses on Problem 4 ($t = 3.14$, $df = 26$, $p < .01$, 1-tail). Problem 5 did not yield significance, ($t = .86$, $df = 26$, NS, 2-tail).

Repeated card choices.--The hypotheses state that there will be a significant main effect between HD and LD, and that no significance will be found within Problems 3 and 5. Within



Problem 4 the High Dogmatic group will score higher than will the Low Dogmatic group. The correction model for this measure involves dividing each S's score on each problem by the number of different card choices possible on that problem (i.e., 16, 32, or 64).

Table 10 presents the means for the 20 cells of this study and Table 11 reports the ANOVA performed on this data.

Table 10
Mean Repeated Card Choice Ratios for
High and Low Dogmatic Subjects
On Social and Non-social Boards
For Each Problem

		Problems				
		1	2	3	4	5
High Dog.	Social	0	.0094	.0021	.0037	.0024
	N-soc.	0	0	.0008	.0016	.0007
Low Dog.	Social	.0011	0	.0006	.0001	0
	N-soc.	.0089	0	.0022	.0022	.0023

Table 11

ANOVA on Repeated Card Choice Ratios

	<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A	Dogmatism	1	.00000532	<1
B	Soc. Sig.	1	.00000056	<1
AB		1	.00029314	5.06*
Error (B)		24	.00005791	
C	Problems	4	.00000852	<1
AC		4	.00009019	3.63**
BC		4	.00007001	2.81*
ABC		4	.00001529	<1
Error (W)		96	.00002487	

* $p < .05$ ** $p < .01$

On this measure significant interactions were obtained between Dogmatism and Social Significance, Dogmatism and Problems, and Social Significance and Problems. None of the main effects were significant.

T-tests were insignificant for Problem 3, and significant for Problems 4 and 5 with the High Dogmatic Ss scoring higher on both of these problems. For Problem 3, $t = .87$, $df = 26$, NS (2-tail). In Problem 4, $t = 6.00$, $df = 26$, $p < .01$, (1-tail), and within Problem 5, $t = 20.00$, $df = 26$, $p < .01$ (2-tail).

Repeated hypotheses.--The hypotheses state that there

will be significant main effect between High and Low Dogmatic subjects, and that no significance will be found between these two groups on Problems 3 and 5. Within Problem 4, HD will score higher than LD. The correction model for this measure involves dividing each S's score on each problem by the number of different hypotheses possible on that problem (i.e., 6, 10, or 15).

Table 12 presents the mean repeated hypotheses ratios for the 20 cells of this study; Table 13 reports a summary of the ANOVA performed on the data.

Table 12
Mean Repeated Hypotheses Ratios for
High and Low Dogmatic Subjects
On Social and Non-social Boards
For Each Problem

		Problems				
		1	2	3	4	5
High Dog.	Social	.0079	.0305	.0087	.0487	.0077
	N-soc.	.0039	.0039	.0065	.0083	.0074
Low Dog.	Social	0	0	.0114	.0423	.0014
	N-soc.	0	0	.0041	.0053	0

Table 13

ANOVA on Repeated Hypotheses Ratios

	<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
A	Dogmatism	1	.0017	1.00
B	Soc. Sig.	1	.0050	2.94
AB		1	.0002	<1
Error (B)		24	.0017	
C	Problems	4	.0025	1.79
AC		4	.0003	<1
BC		4	.0018	1.29
ABC		4	.0003	<1
Error (W)		96	.0014	

It is evident from this table that there are no significant differences here either as main effects or as interactions.

The t-test within Problem 3 was insignificant ($t = .18$, $df = 26$, NS, 2-tail). Within Problem 4 the High Dogmatic group scored higher than did the Low Dogmatic group ($t = 8.55$, $df = 26$, $p < .01$, 1-tail); and within Problem 5 HD also scored higher than LD ($t = 137$, $df = 26$, $p < .01$, 2-tail).

Table 14 presents a summary of the results of this study. In addition to the ANOVAs and t-tests, correlations (product moment) were computed between all measures. Table 15 reports these correlations.

Table 14

Summary of Experimental Results

	ANOVA Main effects	ANOVA in- teractions	T-test Prb. 3	T-test Prb. 4	T-test Prb. 5
Focusing Problems		None	NS	LD > HD	HD > LD
Scanning Problems		None	NS	LD > HD	HD > LD
Card Ch. Problems		None	LD > HD	HD > LD	NS
Un. Hyp.	None	None	HD > LD	LD > HD	NS
Rep. CC.	None	Dog X SS	NS	HD > LD	HD > LD
		Dog X Prb.			
		SS X Prb.			
Rep. Hp.	None	None	NS	HD > LD	HD > LD

Table 15

Pearson Product Moment Correlation Matrix

For Measures on Focusing, Scanning, Card Choices
 Untenable Hypotheses, Repeated Card Choices and
 Repeated Hypotheses

	S	CC	UH	RC	RH
Focusing	+.76	-.44	-.24	-.19	-.23
Scanning		-.44	-.07	-.11	-.16
Card Ch.			+.41	+.69	+.37
Un. Hyp.				+.19	+.25
Rep. CC.					+.20

Note.--N = 28

Discussion

Perhaps the most general statement that can be made about this study is that there are very real differences between High and Low Dogmatic subjects with regard to concept attainment efficiency within a narrowly defined set of conditions. Although neither of the strategy ANOVAs yielded significant interactions as hypothesized between Dogmatism and Problems, then granting the assumption advanced in the introduction that it would not be until Problem 4 that differences would be likely to occur, significant t-test differences within Problem 4 in the expected direction on focusing and scanning would seem to support the hypothesis that High Dogmatic subjects do, in fact, have a greater difficulty in adopting a new task strategy when the requirements of the task suggest such an alteration.

The nonsignificant interaction between Dogmatism and Social Significance, which had been hypothesized, can best be explained as indicative of the failure to effectively manipulate the degree of social threat (i.e., social significance) in this study. As discussed in the introduction to this paper, it is social threat rather than the concept of "socialness" which is (theoretically) disrupting to the highly dogmatic individual. In order to have an adequate test of the hypotheses involving social threat, then, the stimulus array would have to

be socially threatening to the subjects in that condition. Although the array was designed with this idea in mind the final product was more humorous than threatening, owing to the cartoon-like features of the parent and child in each instance.

The only significant main effect within the strategy measures was that related to problems. Focusing and scanning ratios decreased with increases in problem difficulty. This is to be expected. Owing to the correction model which involved an increasingly large divisor with increased problem difficulty, the ratio of number of focusing or scanning incidences to the number of possible incidences will most probably be diminished. And it is this decrease, as a consequence of the correction models, which is most probably reflected in the significant Problems effect.

As predicted, t-test results within Problem 3 were non-significant; and within Problem 4 they were both significant indicating that it is within Problem 4 that strategy alteration becomes necessary. When this strategy change becomes necessary it is the Low Dogmatic group that makes the change. Within Problem 5, contrary to prediction, High Dogmatic subjects scored significantly higher on both focusing and scanning than Low Dogmatic subjects. One possible explanation of this reversal from the results of Problem 4 follows. Because of the rela-

tively difficult nature of Problems 4 and 5 over the first three problems one can expect that when Problem 4 is initially encountered the open-minded individual will seek a more efficient way of solving the problem once he recognizes that his former strategy is inefficient. The more closed-minded individual, on the other hand, although he might recognize the need for some sort of strategy change, is reluctant to make this change because of the success which he had with his former strategy on the first three problems. Indeed, t-test results of Problem 4 compared with those of Problem 3 have supported the reasoning thus far. Whereas no differences were obtained between the two groups on either scanning or focusing on the third problem, differences at greater than the .01 confidence level were obtained on both of these strategy measures within Problem 4. What happens, then, when subjects are given Problem 5, which is equal in difficulty to the fourth problem. Consistent with theory, one can expect that the open-minded individual will seek ways of improving his task strategy in order that his performance will be even more satisfactory than it was on Problem 4. Consequently, he might be expected to attempt some strategy such as focus gambling which, when successful, is far more efficient than conservative focusing. However, focus gambling is rarely successful unless the subject fully understands just exactly how to proceed with this strategy.

Unless he is aware of the precise mechanics of this strategy he is likely to make costly errors which would greatly decrease his focusing score (and concept attainment efficiency). On the first attempts at focus gambling, then, it is legitimate to assert that seldom would an individual have the necessary precision; consequently his focusing score would decrease. The closed minded person, on the other hand, who was reluctant to abandon his former strategy for focusing when he encountered Problem 4 might be somewhat less reluctant to attempt a new strategy (i.e., focusing) on the fifth problem, owing to his lack of efficiency on Problem 4. Consequently, his focusing score should increase appreciably.

Testing the assumption made that on Problem 5 the non-dogmatic individual would attempt focus gambling while the dogmatic individual would be concentrating on conservative focusing, a t-test was run on the mean number of attributes changed per card choice between these two groups. It was assumed that this would be an indication of the extent to which focus gambling was being attempted; for by definition, focus gambling is the changing of more than one attribute on a card choice whereas conservative focusing involves the change of only one attribute. The difference obtained between High and Low Dogmatic groups was significant at greater than the .01 level of confidence ($t = 2.22$, $df = 26$, 1-tail) indicating

that open-minded individuals attempted more focus gambling than did closed-minded individuals on Problem 5. This finding serves to support the explanation given for the greater degree of focusing and scanning employed by High Dogmatic individuals within the fifth problem.

With regard to the four measures of inefficiency, only one of the main effects was significant: the ratio of the number of card choices to the number of card choices possible decreased with problem difficulty. This would be expected, owing again to the correction model employed in the analysis.

Three interactions were significant, all within the measure on the number of repeated card choices: (a) a Dogmatism by Social Significance interaction; (b) a Dogmatism by Problems interaction; and (c) an interaction between Social Significance and Problems.

The interaction between Dogmatism and Social Significance would follow as a correlate of the hypotheses regarding the differential effects of social threat upon High and Low Dogmatic individuals. However, since the other measures taken in this section would also follow as correlates of these hypotheses but were not supported, and because the direction of the interaction is not entirely as what would have been expected, it might be more parsimonious to speculate that

perhaps this measure somehow differs from the other measures of inefficiency, in a way not as yet investigated, but that this difference might account for the findings.

The other two interactions chiefly reflect gross differences on the first two problems rather than real differences across problems. Because there are no differences between Problems 1 and 2 with regard to problem difficulty, any differences between these two must be explained in terms of learning effects or practice effects. The reader is referred to the discussion of these effects presented earlier in this paper.

On the four secondary measures of inefficiency within Problem 3, two of the t-tests yielded significant differences between High and Low Dogmatism groups. On the number of card choices to solution Low Dogmatic Ss were significantly higher than High Dogmatic Ss; and on the number of untenable hypotheses the High Dogmatic Ss scored significantly higher than did the Low Dogmatic group. These significant findings are contrary to direct hypothesis. However, the hypotheses advanced were formulated for purposes of supporting the assumption that it would not be until Problem 4 that significant differences between High and Low Dogmatic Ss would appear. The fact, then, that these are the only two differences which appear (out of six from this standpoint) does, in fact, give valid support

to this assumption. At the same time, however, these two differences also give indication that the need for change does not appear suddenly and immediately, but allows of a slight amount of build-up. Significance in all four of the secondary measures and both strategy measures within Problem 4 (three of which were in the expected direction) compared to significance in only two of the six measures in Problem 3, then, further supports the assumption that the fourth problem is the "target problem" for change. Within Problem 5 significance was obtained on the number of repeated card choices and the number of repeated hypotheses. In both of these cases, High Dogmatic Ss scored higher than Low. If the emphasis here is placed on the lack of significance on two of the measures than one can speculate that perhaps these findings indicate that the Dogmatic subject is beginning to "catch up" with the open minded individual on the use of focusing and scanning strategies (while as has already been noted, the open minded individual is approximating a focus gambling strategy).

Finally, it should be noted that the correlations obtained in this study are in essential agreement with those found in other studies.

The findings that under specified conditions the degree of dogmatism does exert an influence on concept attainment strategy and efficiency is in accord with the theoretical work

of Rokeach (1960) and impart a certain amount of empirical support to his contention that in a problem solving situation in which analysis and synthesis are required the highly dogmatic individual will be initially less efficient than the non-dogmatic individual. These findings also provide a basis for further generalization of his empirical findings which were based on a restricted type of problem solving task which he calls the "Doodlebug Problem." In this task the subject is called upon to overcome pre-existing belief sets based upon everyday experience in order to solve a problem which requires the adoption of a new belief set which contradicts the former. In the present study a parallel, but quite different type of problem was employed: parallel in that here too new beliefs had to be substituted for old; different in that the "Doodlebug Problem" involves a reorganization of known material to arrive at a novel solution while the concept attainment task involves the identification or utilization of relevant material from a pool of both relevant and irrelevant material. In extending this a little further, the reader might be reminded of the work of Luchins (1942), who talked of Einstellung (loosely defined as "mental set") as hindering the solution of later "water jar problems" after the solution to earlier problems had been learned. In fact, one might generalize the findings of this study and the work of Rokeach to include tasks such as those Luchins used without too much risk.

On the other hand, the findings pertaining to social significance offered no support to the theoretical work of Rokeach. As has already been stated, however, this may well be due to the failure in this study to actively manipulate the variable of social significance. However, another way of looking at this variable (operationally) is to disregard the concept of social significance and appeal to the concepts of "form board" versus "sequence board" (Bruner et al. 1956; Laughlin, 1965). Essentially, the distinction is between stimulus arrays in which each "instance" consists in a meaningful figure (e.g., squares, triangles, human figures), or a series of discrete characters of information (e.g., a sequence of differently colored plus signs and minus signs). Both Bruner et al. and Laughlin obtained significant differences in the amount of focusing between these two types of boards. The present study yielded no differences, and the most logical explanation available seems to be that the N was too small in this study to bring out these differences.

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Appendix I

Instructions Read to Subjects Explaining Concept Attainment Procedure

Social board.--This is an experiment in thinking. If you take a look at the large board in front of you, you will see that there are 64 cards on it arranged in 8 rows of 8 cards each. Each card is numbered. Now, there are six different things that you can talk about in these cards. You can mention the sex of the people (male or female), their race (Negro or White), their activity (running or standing still); the weapon that the attacker is using(fist or club), the time (day or night), and the place where the activity is taking place (indoors or outdoors). You will notice that in each picture a child is threatening his parent. These 64 cards are all the possible combinations that you can make out of these six ideas using one of the two possible types of each idea.

Because most of these cards have something in common with each other card we are able to group them into various smaller groups according to different rules. Thus, we could make the rule "Only cards with White Females will count." The rule here would be "White Female" and each card that showed White Females on it would be part of that group. (give an example of some cards that would follow the rule and some that would not). Or, we could make the rule "All cards with Day and Club will count."

Here the rule would be "Day-Club" and all cards showing Day and Club would be part of the group. (give another example as above). Other examples of rules would be "female-night," or "Negro-running," or "fist-outdoors," etc. Do you see the point?

In this experiment your job will be to guess the rule that I am thinking of. I will start you off by pointing out one card which follows the rule I am thinking of. Then you will just pick any other card you want to, and if that card follows the rule I'll say "yes." If it does not follow the rule I'll say "no." Keep in mind that the card has to follow both parts of the rule in order for me to say "yes." Thus, if the rule I am thinking of is "outdoors-night" and the card you pick shows outdoors-day I will say "no" even though your card partly followed the rule. After I have told you if the card you selected follows the rule you will make a guess as to what the rule is. If your guess is completely right (in other words, if you guess both parts of the rule) I will say "yes" and you will have solved the problem. If your guess is partly or completely wrong I will say "no" and in this case you will then pick another card. Again I'll say "yes" or "no" depending on whether the card you picked follows the rule. Again you are to guess the rule. You just keep on doing this until you have guessed the rule. The object of these tasks is to solve the problem (in other words, to guess the rule) in as few card-

choices as possible. I will also keep track of how much time it takes you to solve each problem, but you don't have to worry about that. It's just for my own records. Any questions?

Now, in order to make it easier for you until you get used to the procedure I'm going to cover up all but 16 cards so you won't have so many to deal with at first. (cover board placed over stimulus array) Now, because we've got so many cards covered up we're only going to use four of the ideas on the cards. (reference card handed to S) You'll notice that Race and Location don't change in the 16 cards that you see; so don't even bother to use them. Just use Sex, Time, Weapon, and Position and forget all about the other two, OK? (initial focus card then pointed out to S)

Non-social board.--This is an experiment in thinking. If you take a look at the large board in front of you, you will see that there are 64 cards on it arranged in 8 rows of 8 cards each. Each card is numbered. There are six different colors on each of these cards. These are Blue, Orange, Black, Yellow, Green and Red, always in that same order. Each color can be either a plus sign or a minus sign. These 64 cards are all the possible combinations that can be made of these six colors using one of the signs (plus or minus) for each of the six colors.

Because most of these cards have something in common with each other card we are able to group them into various smaller groups according to different rules. Thus, we could make the rule "Only cards with blue plus - green minus will count. The rule here would be Blue Plus-Green Minus, and each card that showed a blue plus and a green minus would be part of that group. (give an example of some cards that would count and some that wouldn't) Or, we could make the rule "All cards with Black-Minus - Yellow Minus will count." Here the rule would be black minus - yellow minus and all cards showing these two things would be part of the group. (give another example as above) Other examples of rules would be Red Minus - Orange Plus, or Green Plus - Black Plus, or Blue Minus - Orange Plus, etc. Do you see the point?

In this experiment your job will be to guess the rule that I am thinking of. I will start you off by pointing out one card which follows the rule I am thinking of. Then you will just pick any other card that you want to; if that card follows the rule I'll say "yes." If it doesn't follow the rule I'll say "no." Keep in mind that the card has to follow both parts of the rule in order for me to say "yes." Thus, if the rule I am thinking of is "Green Minus = Black Plus," and if the card you pick shows "Green Minus - Black Minus," or "Green Plus - Black Plus" I will say "no" even though the card

you picked followed part of the rule. After I have told you if the card you selected follows the rule I am thinking of you will make a guess as to what the rule is. If your guess is completely right (in other words, if you guess both parts of the rule) I will say "yes" and you will have solved the problem. If your guess is partly or completely wrong I will say "no" and in this case you will then pick another card. Again I'll say "yes" or "no" depending on whether the card you picked follows the rule. Again you are to guess the rule. You just keep on doing this until you have guessed the rule. The object of these tasks is to solve the problem (in other words, to guess the rule) in as few card-choices as possible. I will also keep track of how much time it takes you to solve each problem, but you don't have to worry about this. It's just for my own records. Any questions?

Now, in order to make it easier for you until you get used to the procedure I'm going to cover up all but 16 cards so you won't have so many to deal with at first. (coverboard placed over stimulus array). Now because we've got so many cards covered up we're only going to use four of the colors on the cards. (reference card handed to S) You'll notice that blue and yellow don't change in the 16 cards that you see; so don't even bother to use them. Just use orange, black, green and red, and forget all about the other two, OK? (S was then given the initial focus card)

Appendix II

Rokeach Dogmatism (E) Scale

The following is a survey of what the general public thinks and feels about a number of important social and personal questions. The best answer to each statement below is your personal opinion. We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement you can be sure that many people feel the same as you do.

Mark each statement in the left margin according to how much you agree or disagree with it. Please mark every one. Write +1, +2, +3, or -1, -2, -3, depending on how you feel in each case.

+1: I AGREE A LITTLE

-1: I DISAGREE A LITTLE

+2: I AGREE ON THE WHOLE

-2: I DISAGREE ON THE WHOLE

+3: I AGREE VERY MUCH

-3: I DISAGREE VERY MUCH

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____ 1. The United States and Russia have just about nothing in common.

____ 2. The highest form of government is a democracy and the highest form of democracy is the government run by those who are most intelligent.

- ____3. Even though freedom of speech for all groups is worthwhile as a goal, it is unfortunately necessary to restrict the freedom of certain political groups.
- ____4. It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.
- ____5. Man on his own is a helpless and miserable creature.
- ____6. Fundamentally, the world we live in is a pretty lonesome place.
- ____7. Most people just don't give a damn for others.
- ____8. I'd like it if I could find someone who would tell me how to solve my personal problems.
- ____9. It is only natural for a person to be rather fearful of the future.
- ____10. There is so much to be done and so little time to do it in.
- ____11. Once I get wound up in a heated discussion I just can't stop.
- ____12. In a discussion I often find it necessary to repeat myself to make sure I am being understood.
- ____13. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.
- ____14. It is better to be a dead hero than be a live coward.

- ___15. While I don't like to admit this even to myself, my secret ambition is to become a great man, like Einstein, or Beethoven, or Shakespeare.
- ___16. The main thing in life is for a person to want to do something important.
- ___17. If given a chance I would do something of great benefit to the world.
- ___18. In the history of mankind there have probably been just a handful of really great thinkers.
- ___19. There are a number of people I have come to hate because of the things they stand for.
- ___20. A man who does not believe in some great cause has not really lived.
- ___21. It is only when a person devotes himself to an ideal or cause that life becomes meaningful.
- ___22. Of all the different philosophies which exist in this world there is probably only one which is correct.
- ___24. To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.
- ___25. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.

- ___26. In times like these, a person must be a pretty selfish person if he considers primarily his own happiness.
- ___27. The worst crime a person could commit is to attack publicly the people who believe in the same things he does.
- ___28. In times like these it is often necessary to be more on guard against ideas put out by people or groups in one's own camp than by those in the opposing camp.
- ___29. A group which tolerates too much difference of opinion among its own members cannot exist for long.
- ___30. There are two kinds of people in this world; those who are for the truth and those who are against the truth.
- ___31. My blood boils whenever a person stubbornly refuses to admit he's wrong.
- ___32. A person who thinks primarily of his own happiness is beneath contempt.
- ___33. Most of the ideas which get printed nowadays aren't worth the paper they are printed on.
- ___34. In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.
- ___35. It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.

- ___36. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.
- ___37. The present is all too often full of unhappiness. It is only the future that counts.
- ___38. If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all."
- ___39. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what's going on.
- ___40. Most people just don't know what's good for them.

Appendix III

Gough-Sanford Rigidity Scale

Below are listed 21 statements. Each of the statements is a statement about how people do things or how they feel about certain things. Decide whether the sentence is true as applied to you, or false as applied to you. There are no right or wrong answers. If you feel that the statement is true as applied to you encircle the "T" before the statement; if false as applied to you, encircle the "F" before the statement. Thank you.

- - - - -

- T F I am often the last one to give up trying to do a thing.
- T F There is usually only one best way to solve most problems.
- T F I prefer work that requires a great deal of attention to detail.
- T F I often become so wrapped up in something I am doing that I find it difficult to turn my attention to other matters.
- T F I dislike to change my plans in the midst of an undertaking.
- T F I never miss going to church.
- T F I find it easy to stick to a certain schedule, once I have started it.

- T F I usually maintain my own opinions even though many other people may have a different point of view.
- T F I do not enjoy having to adapt myself to new and unusual situations.
- T F I prefer to stop and think before I act even on trifling matters.
- T F I try to follow a program of life based on duty.
- T F I usually find that my own way of attacking a problem is best, even though it doesn't always seem to work in the beginning.
- T F I am a methodological person in whatever I do.
- T F I think it is usually wise to do things in a conventional way.
- T F I always finish tasks I started, even if they are not very important.
- T F I often find myself thinking of the same tunes or phrases for days at a time.
- T F I have a work and study schedule which I follow carefully.
- T F I usually check more than once to be sure that I have locked a door, put out the light, or something of the sort.
- T F I have never done anything dangerous for the thrill of it.
- T F I am always careful about my manner of dress.

T F I always put on and take off my clothes in the same order.

Abstract

This study was designed to investigate the ability of High and Low Dogmatic Ss to alter concept attainment strategy under conditions of High and Low Social Significance. 42 Ss were given five problems using stimulus arrays consisting of either socially significant instances or sequences of plus signs and minus signs. They were also administered the E Scale and a Rigidity Scale. On the basis of their Dogmatism scores they were divided into a High, Moderate or Low Dogmatism Group of 14 Ss each. The Moderate Group was then discarded from further analysis. ANOVAs on the strategy measures, focusing and scanning, and on four measures of inefficiency, (i.e., number of card choices, untenable hypotheses, repeated card choices and repeated hypotheses) yielded differences only across problems, and three only tenuously interpretable interactions within the repeated card choices measure. T-tests on each of these measures within Problem 3 between High and Low Dogmatic Groups yielded significant differences on only two of the measures, both secondary measures of inefficiency. On Problem 4, t-tests yielded differences on all six measures indicating significantly more use of both strategies, and less instances of inefficiency on all but the number of untenable hypotheses, by Low Dogmatic Ss. On Problem 5, t-tests indicated more focusing, scanning, repeated card choices and repeated hypotheses by the High Dogmatic Group, and signifi-

cantly more attempts at focus gambling by the Low Dogmatic Group.

The conclusions are that differences do appear between Dogmatic and Non-dogmatic Ss when strategy change is required, (i.e., on Problem 4), and that the Non-dogmatic Ss continue to seek new strategies for improving performance even further. Except for two interactions, all data on social significance was nonsignificant; however, because it is not certain that social significance was manipulated no conclusions can be drawn from this data. Correlations in this study are in essential agreement with those of previous studies.

Approval Sheet

This thesis submitted by James M. Toroivia has been read and approved by two members of the Department of Psychology.

The final copies have been examined by the director of the thesis, and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

Dec. 1, 1966
Date

Patrick R. Laughlin
Signature of Advisor